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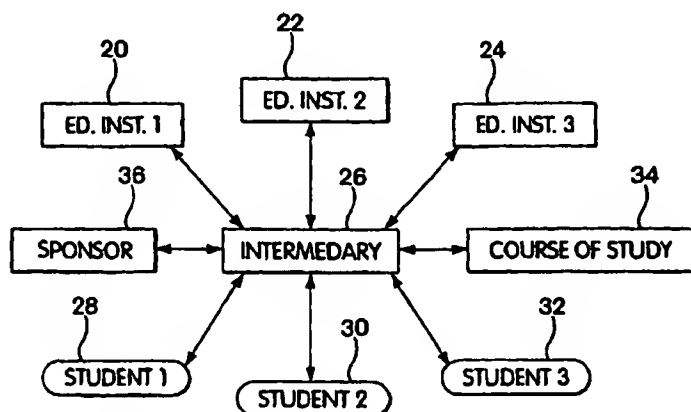
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(54) Title: OPEN SOURCE UNIVERSITY



(57) Abstract: An open source university provides an essentially unlimited number of students with access to education on-line at low or no cost. The education can comprise secondary, undergraduate, or graduate education. Financial support can come from third parties, or intermediaries (26), who are given access to the student's attention. A course of study can be an undergraduate program, upon sufficient completion of which a student can be admitted to a second-stage, on-campus course of study such as medical school. Alternatively, the on-line course of study can be comprehensive, followed by an in-person quality assurance examination. An overall course of study, in addition to an undergraduate pre-medical program and medical school, can be divided into a first stage and a second stage, where the first stage is conducted on-line and the second stage is conducted on campus upon sufficient completion of the first stage. Sponsorship during any stage, especially the first stage, can allow low or zero-cost education for the student during the second stage.

## OPEN SOURCE UNIVERSITY

### Field of the Invention

The present invention relates to a method and apparatus for providing education  
5 on-line to virtually anyone in the world with access to the Internet, at little or no cost to  
students. The invention also relates to a two-stage educational process involving an on-  
line stage remote from an educational institution, and a succeeding on-campus stage.

### Background of the Invention

As we enter the new millennium, worldwide societies continue to face persistent  
10 challenges. In the world today there is a severe scarcity of educated and highly-educated  
citizens, including medical personnel. Services requiring that providers have a  
significant degree of education, such as medical care, often are deficient at best in  
developing communities, due in part to the lack of access to higher education for  
members of those communities.

15 Higher education is a costly endeavor, both for the student undertaking it and for  
the academic and non-profit organizations sponsoring it. For example, the cost of an 8-  
year education leading to a medical degree at a private university in the United States can  
run up to \$45,000 per year, a considerable obstacle for the vast bulk of medical school  
aspirants, insurmountable for many. A vast majority of the world's population are  
20 unable to pursue an education at a top university because they are unable for economic,  
geographical, or social reasons to attend. In addition to the high financial cost, the  
process itself is one of the most difficult professional undertakings, in the world,  
therefore insufficient preparatory education presumably excludes a large number of  
qualified candidates. In this way, it may additionally be skewed against persons outside  
25 of the first world.

Currently, there are few alternatives other than standard university educational  
programs for an individual who desires to pursue higher education. For example, one  
who chooses to pursue a career as a medical doctor is required to complete an average of  
three to four years of college coursework before receiving any practical medical training.  
30 Additionally, medical schools located in a certain country rarely accept candidates who  
have not completed an advanced degree at an institution located in the same country.  
These hurdles make it close to impossible for a person of scarce financial resources or  
living in a remote location to even enroll in an accredited medical program, regardless of

his or her talent. These deficiencies in the existing funding and educational system weigh an untold (but huge) cost on the financial resources, human potential, and quality of life of the world's peoples.

Furthermore, traditional medical schools do not have the capacity to keep up with  
5 rising demands in medical education. The developing world is emerging as a powerful economic force, and as such is demanding more and better quality health care. However, it lacks accredited medical facilities to train the required physicians. This, in turn, comes at a substantial cost that is passed along to the students. Additionally, governments are increasingly unwilling to offer support to aspiring post-graduates. This "crisis in  
10 education" is well documented.

While a variety of institutions currently offer higher education programs over the Internet, very few offer degrees accredited by prestigious universities and none are known to the inventors to offer highly technical degrees, such as medicine.

Examples of two on-line academic programs follow.

15 The Open University: <http://www.open.ac.uk/>. The Open University was incorporated in the United Kingdom in 1969. Since 1992 it has offered various on-line education programs throughout Europe. In 1998 it was the largest single teaching institution, with over 200,000 students enrolled in its programs. The Open University employs some 900 full-time academic lecturers and tutors. The average cost to obtain a  
20 Baccalaureate level per student was \$5,000 in 1998. The Open University employs the Internet as a means of distributing some course material and as a communication channel between students, tutors and University administration. The Open University offers several undergraduate and post-graduate on-line programs, including: arts and humanities, business and management, computing and information technology,  
25 development studies, education, environment, health and social welfare, law, mathematics and statistics, modern languages, psychology, biology, chemistry, earth sciences and physics, social sciences, and technology and engineering. These programs lead to degrees from the Open University itself. Degrees in social sciences and arts have been commonly accepted by potential employers. On the other hand, technical degrees  
30 have lacked wide acceptance by industry.

Virtual Online University (Athena University): <http://www.athena.edu/>;  
<http://www.vousi.com/>. The Virtual Online University was established in 1994 in the United States. Since 1997 it has offered international Internet-based programs. The

institution offers undergraduate programs through Athena University, including Bachelor of Arts in History, Bachelor of Arts in English or Foreign Languages, Bachelor of Science in Computer Science, and Bachelor of Arts in Computer Aesthetics.

Additionally it offers an International Master of Business Administration program, which is accredited by the French Ministry of Education. Average degrees take from 3 to 6 years of study and can cost up to \$15,000.

Online Education: <http://www.online.edu/>. Online Education was founded in 1992 in the United States. It is aimed at offering on-line courses accredited by various universities around the world. It offers undergraduate programs in Nursing and Health Studies. Additionally, graduate management programs in Management Practice, Health Management, Total Quality Management and Finances are offered. The average undergraduate program takes 3 years and can cost from \$5,000 to \$10,000. The average graduate program takes 2 years and costs \$10,000 to \$15,000. Additionally, it offers on-line academic support and an on-line bookstore.

National Technological University: <http://www.ntu.edu/>. The National Technological University (NTU) was founded in 1984. It offers remote education via satellite and provides limited on-line material. It offers several undergraduate programs, including Bachelors of Science in Engineering, Management and computer science. Graduate programs offered by NTU include Masters of Science in Information Systems, Optical Science and Project Management. Different universities of diverse stature worldwide accredit their programs. The cost of an undergraduate degree ranges from \$15,000 to \$25,000 and an average 4-5 years of study are required. Graduate programs cost from \$10,000 to \$20,000 and have an average duration of 2 years. In addition to accredited programs, NTU also offers a variety of tailored noncredit programs targeted at corporate organizations.

Several physical universities and institutions offer diverse on-line courses, degrees and continuing education programs. Some of the most prominent ones include the State Universities of California, Colorado, Delaware, Louisiana, Maine, Massachusetts, Minnesota, and Pennsylvania. These institutions usually offer nontechnical undergraduate and graduate degrees, such as Management, Business Administration, Health Management, Arts and Humanities. Most of the programs include on-line material as part of the curriculum, while some still require the student to attend a

minimum number of hours on campus. The cost of these programs varies from about \$5,000 to \$25,000.

Many industries that have significant relevance to a particular field of study also have significant economic resources. For example, the pharmaceutical industry has undergone an unprecedented boom in the past decade. Sales for the industry worldwide rose from 32 to over 200 billion US dollars from 1992 to 1999. Approximately 5-10% of total US sales were conducted through mail order, while retail sales accounted for almost 60%. Of this 60%, over two thirds were prescribed by medical doctors. Direct physician orders amounted for almost 15% of the total sales.

While some on-line programs of study exist, and many offer convenience and flexibility, many are not ideal in that they do not offer significant change in the way education is provided. It is one object of the present invention to provide significant changes in educational services, via use of the Internet, that can significantly improve accessibility, quality, and efficiency in education.

#### Summary of the Invention

The present invention provides a series of methods, apparatus, and systems for education. In one aspect, the invention provides methods for providing education involving one or more educational institutions, one or more students, and an intermediary who facilitates administration of the educational program and optionally coordinates funding of the program with a sponsor.

In one embodiment, a method of the invention involves registering an educational institution or a plurality of educational institutions, registering a student or a plurality of students, and providing an on-line course of study to the student or students. The performance is measured over time and, based on the measured performance, a student is admitted to an educational institution.

In another embodiment, a method of the invention involves a first on-line, off-campus stage of education and a second on-campus stage at an educational institution. An educational program is provided in which performance of a student in the first stage forms the basis for admission of the student to the second stage.

In another embodiment, a method of the invention involves educational services in cooperation with Internet services. Internet services are provided to a plurality of Internet service customers, and in association with providing the Internet services, an on-

line course of study of at least one educational institution is provided to at least one customer.

Another method of the invention specifically relates to funding of on-line education. An on-line course of study is provided by at least one educational institution to at least one student. The course of study is funded in part or in whole by at least one  
5 merchant interested in selling goods and services to the student or educational institution.

Another method of the invention involves an on-line test useful for consideration of admission of a student to an educational institution. An on-line test is provided to at least one student, the performance of at least one student is measured, and information  
10 identifying the performance of the student is provided to at least one educational institution for consideration of admission of the student. A plurality of educational institutions can cooperate according to this method in which each educational institution receives information on the performance of a particular student.

Another method of the invention involves an on-line course of study including  
15 courses from different educational institutions. The on-line course of study includes a plurality of courses, at least one of the courses being provided by a first educational institution and at least a different one of the courses being provide by a different educational institution. In another method a plurality of educational institutions provide, in combination, a single course. Accordingly, a course of study can be provided on-line  
20 that includes a plurality of educational institutions participating in providing a plurality of courses where individual educational institutions provide individual courses, courses are provided that represent the combination of input from a plurality of educational institutions, or combination.

Another method of the invention involves education in combination with Internet  
25 subscription. An on-line Internet subscription service is provided to a subscriber. An on-line course of study associated with at least one educational institution is provided to the subscriber free of charge.

In another aspect, the invention provides computer implemented methods. One computer implemented method comprises receiving, from a student, information  
30 identifying a student and an on-line course of study comprising a plurality of courses, wherein one or more educational institutions participate in providing the plurality of courses and the plurality of courses are stored in data files. Data is retrieved from the

data files, and the retrieved data is sent to the student to enable the student to take the course of study.

Another computer implemented method involves receiving, from a student, information identifying the student in a course of study, sending data to the student to  
5 enable the student to take the course of study, and measuring the performance of the student in the course of study over time. The measured performance of the student is used for determining whether to admit the student to an educational institution.

Other advantages, novel features, and objects of the invention will become apparent from the following detailed description of the invention when considered in  
10 conjunction with the accompanying drawings, which are schematic. In the figures, each identical or nearly identical component that is illustrated in various figures is represented by a single numeral. For purposes of clarity, not every component is labeled in every figure, nor is every component of each embodiment of the invention shown where illustration is not necessary to allow those of ordinary skill in the art to understand the  
15 invention.

#### Brief Description of the Drawings

Fig. 1 shows the relationship between educational institutions, students, an intermediary, a course of study, and a sponsor according to one set of embodiments;

Fig. 2 illustrates an arrangement in which at least two educational institutions  
20 provide a combined course of study over the Internet to at least one student;

Fig. 3 is a flow chart showing a process by which a student is administered an on-line course of study, evaluated, and optionally admitted to an on-campus course of study;

Fig. 4 illustrates computer systems of various of the parties shown in Fig. 1, and a wide area network providing communication between the computer systems;

25 Fig. 5 shows a computer system suitable for administration of a course of study and evaluation;

Fig. 6 shows the relationship between an educational institution, a student who is provided a course of study by the educational institution, and a sponsor;

Fig. 7 shows the relationship between an educational institution, Internet service  
30 provider, and a student;

Fig. 8 shows the relationship between an educational institution, an intermediary, and a student; and

Fig. 9 is a flow chart showing a process by which an educational institution or an intermediary administers a course of study over the Internet and evaluation of the student's performance relevant to admission.

Detailed Description of the Invention

5           The present invention provides a series of methods, systems, and apparatus for providing educational services. It provides advantages over the traditional "open university", which provides content and accreditation, and charges students in return. The open source university of the invention involves comprehensive restructuring of undergraduate and post-graduate education and funding.

10           Advantages of the Open Source University system of the invention include the following: It can provide world-wide access to the world's best universities; it can obviate admissions procedures; it can promote continuing education along a timescale never before pursued; it can provide advanced degrees (such as medical degrees, illustrated here) without cost to both the students and the universities concerned; it can  
15   harness the power of the Internet to form a huge and most economically potent user group; it can greatly expand a pool of applicants for an educational institution; and it can satisfy the needs of governments and world organizations as it embraces the singular goal of education for all, starting with the domain of world health care and medical school/services.

20           One aspect of the invention provides a system that can be a solution to a shortage of highly-educated personnel in various parts of the world, by solving problems that restrict entry of qualified personnel into the requisite educational programs. This aspect provides funded education, optionally free education, at world-class universities. This aspect of the invention is applicable to essentially any educational program. Specific  
25   examples of funded or free medical school education (referred to below as "virtual medical school") at world-class universities or consortia of world-class universities are presented, but it is to be understood that this model applies to essentially any educational field.

          The concept of the virtual medical school is to create a large consortium of the  
30   world's best medical schools and programs. These Universities offer up and supervise a certain number of core courses of excellence, each using online media they are already developing, but not distributing externally. These courses are offered online for free, and



count towards accreditation in the field. The cost to the participating university or world-wide center of excellence is extremely low.

External sponsors will cover most or all of the cost of the operation of the virtual medical school. This includes the cost of transcribing the course material and  
5 distributing it on-line, as well as the cost incurred by tracking, tutoring and eventually giving practical training to the students. External sponsors can include pharmaceutical companies and health maintenance organizations (HMO) paying for banner space, publicity, and "sponsorship"; Internet service providers (ISP) paying for dedicated  
10 content of "medical web packages"; book and language placements; externally offered background courses (such as Biology, Calculus and other accreditation requirements); non-profit health organizations, such as the World Health Organization (WHO), the United Nations (UN) and the European Union (EU); computer manufacturers providing on-line services and hardware; grants, sponsorships and scholarships from Universities and other educational institutions; etc.

15 The "customers" of the virtual medical school are effectively the external sponsors. Pharmaceutical companies and healthcare organizations will be able to present their products to the world's top physicians for a period of eight years before they move out into the very real and high-profile world of medicine. On-line retailers of textbooks and medical supplies would obtain direct access to their biggest potential markets,  
20 significantly improving the effectiveness of their on-line advertising. These effects are further enhanced by the program's student *capture*, as unlike traditional medical schools, the educational systems of the invention can capture not 50, 200, or 400 students per year such as classes of traditional schools, but thousands, hundreds of thousands, or millions of students. Companies offering background on-line courses, such as technical English,  
25 calculus or biology, can capture their audience with improved efficiency and appeal to customers who are pre-defined as serious and committed to their course of study. The audience for all these institutions can be as big as 10 million medical students world-wide.

The virtual medical school provides a variety of services aimed at students  
30 enrolled in the program, commercial partners, and non-profit organizations sponsoring the project.

All of these parties benefit as follows. Universities may receive many highly-qualified students to which they would not otherwise have had access, and with only

very minor investment, while also increasing web presence and business expertise. Students world-wide receive low cost or free, high-quality medical education at the world's best universities. Pharmaceutical companies and third-party educational service providers receive a pre-filtered channeled pathway to their core constituency, i.e.,  
5 students. HMOs, governments, and non-governmental institutions' funding dollars go much further on the web, and reach their target more efficiently. The Open Source University/Virtual Medical School receives a portion of the funds proportional to the number of students captured.

The following are optional features of the Open Source University of the  
10 invention, but are not limitations of the invention. That is, some or all of the following features can be included in a particular program.

Free admission: All applicants will be accepted to the program regardless of economic situation, academic background, or nationality. Students finding any of the first three years of courses too difficult may repeat them endlessly for free.

15 Low cost or free on-line course materials: The students enrolled in the virtual medical school can be given unlimited access to all the course material required. This access can be made available through a dedicated web site(s) that will operate uninterruptedly.

The first four years of an eight-year medical degree can be virtual, with the first  
20 two years being entirely digital (without even live tutors). Years 3 and 4 can utilize live and automated (on line) tutors. That is, this can be a "transitional" period whereby the student continues distant learning but has now been assigned a mentor who works closely, but remotely, with him or her, and at times in person. During the last four years of training, the students, now receiving practical training at a target university, can still  
25 have unlimited access to electronic course material.

On-line reference material: Limited reference material, such as textbooks, journal articles, and specialized medical search engines can be made available to the enrolled students for free. Third parties can offer both limited and comprehensive reference services through the virtual medical school. These providers may bill the users  
30 directly for their service and be charged a standard "presence" fee by the virtual medical school.

Free on-line tutoring for tracked students: After completing the first two years of training, the students can be "tracked" towards a "target" university for the two

subsequent years. This target university ideally is an actual accredited institution where the student will eventually conduct his or her residency. Tracking might only be considered after thorough review and examination of students, and students may be matched to a target university in light of academic performance, geography, and availability.

During this period the student can receive free, unlimited on-line tutoring from personnel at the target university (many of which are already deploying automated tutoring systems).

Sponsored practical training at the target university: During the last three years of the program, the students may physically attend their target university. Funding for this last period can be provided through the virtual medical school by the target universities, the commercial partners, non-profit and government organizations, and the virtual medical school itself, and will largely take advantage of existing final-year funding methodologies. Accreditation after the residency period may be issued by the target university.

Career Services: The students graduating from the virtual medical school may receive free career and placement services. Different hospital, research and academic institutions will be able to place job offerings and contact potential candidates through our network.

Free or low-cost continuing education: In conventional medical school training, learning stops at the end of the residency period, and accruing continuing medical education credits is often a difficult and daunting aspect of a physician's life. The virtual medical school will offer free or low-cost online course material in a variety of related fields. These courses will be available to the general medical community.

Services aimed at commercial partners: This section refers to services provided by the virtual medical school for the commercial partners who sponsor the company.

Advertisement: Commercial sponsors will be able to purchase advertisement space on the virtual medical school web site. Through the virtual medical school providers interested in targeting the medical community will get enhanced access to their target audience; pre-filtered, and sustained. This includes enrolled medical students, practicing physicians participating in continuing education programs, and the general medical community, when accessing the reference and search capabilities of the virtual medical school.

Advertisement in the virtual medical school can be significantly more efficient than passive forms of advertisement (i.e. in printed journals or medical magazines) and advertisement in other web sites. The commercial sponsor are able to present their products, be it a new drug from a prominent pharmaceutical company or a new diagnosis  
5 system from a biotechnology firm, to their current and future potential customers for extended periods. The effectiveness of advertisement campaigns is significantly improved by having a focused audience. This is typically of enormous appeal to pharmaceutical and biotechnology companies, health maintenance organizations, and retailers of medical supplies, to name a few.

10       Placement: On-line retailers may purchase the rights to conduct business through the web site of the virtual medical school. Providers of on-line background courses (such as technical English, calculus, biology), and book and supply retailers can benefit. These companies benefit from enhanced customer access, direct Internet linkage, and a higher percentage of sales per customer visit to their web site.

15       Service Providing Partnership: Internet service providers and computer manufacturers have the possibility of partnering up with the virtual medical school and offer dedicated "Medical Web Packages." Through this program, service providers may offer free computers in exchange for a monthly fee associated with providing the Internet connection required for gaining access to the virtual medical school. While similar  
20 programs (free hardware for Internet access purposes) are already in place in the United States and some parts of Europe, they have been generally aimed at the general public. Through this program, students get dedicated medical school bandwidth at no or little cost.

      Services aimed at non-profit organization sponsors: Non-profit organizations  
25 such as the WHO and the UN help sponsor a share of the practical training cost for enrolled students through existing programs. These organizations, as non-profit sponsors, have access to the following services from the virtual medical school.

      Information services: The virtual medical school compiles, organizes and archives information about the students enrolled in the program and their progress. This  
30 information can be made available, in a confidential and anonymous form, to non-profit organizations that sponsor the school. This information can be invaluable in understanding the evolution and adequacy of healthcare systems in different communities.

Placement Services: The non-profit sponsoring organizations get access to the personal academic records of the students enrolled in the program who so desire. This allows the organizations to sponsor students from different communities for specific training or specialization. It also allows students to identify community service or research opportunities within worldwide programs sponsored by the organizations.

Testing and maintenance of developing world medical content: Non-profit sponsoring organizations may be free to use the virtual medical school's infrastructure (the most daunting aspect of most NGO's technical outreach programs) for the dissemination of program and training materials.

Exemplary embodiments of the invention will now be described with reference to the accompanying drawings. Fig. 1 illustrates schematically one arrangement for providing education to a plurality of students. A plurality of educational institutions, or universities 20, 22, and 24 are shown as participants in the system which also includes an intermediary 26 and a plurality of students 28, 30, and 32. Educational institutions 20-24 are in communication with intermediary 26, and intermediary 26 is, in turn, in communication with each of student 28-32. At least some of the communication is on-line, particularly the communication between the intermediary and the students. Indeed, all communication may be on-line.

Educational institutions 20-24 can be any of a variety of institutions including, for example, secondary schools, post-secondary (undergraduate) schools, graduate schools, medical schools, law schools, technical schools, and the like. Essentially any educational institution is appropriate for association with systems of the invention. As noted above, a virtual medical school is exemplified, to explicate the invention. Educational institutions 20-24, for example, can be two or more different types of institutions offering different types of courses. While three educational institutions are illustrated in Fig. 1, any number can participate. In preferred embodiments, more than one (i.e., at least two) institutions participate, and typically many more will participate. The institutions can be similar, i.e., each can be a medical school, or can be different, one being an undergraduate liberal arts education provider, another a secondary school, another a graduate school or medical school, etc.

Intermediary 26 can be an entity established for the specific purpose of implementing the educational programs of the invention. As an example, intermediary 26 can be the "virtual medical school" referenced above. Alternatively, the intermediary

can be an Internet service provider, a division of one or more of the educational institutions, a governmental agency, or the like, or another body.

Students 28-32 can be at two or more different levels, receiving different courses of study from intermediary 26, or can be of approximately equal educational level. The students can be situated essentially anywhere geographically so long as access to the Internet is provided for each.

In Fig. 1, a course of study 34 is shown in association with intermediary 26. The invention contemplates establishing a course of study to be provided to students 28-32 via intermediary 26 with input from at least one of educational institutions 20-24. Preferably, a plurality of educational institutions contribute to the course of study. The course of study can include a plurality of courses, different courses being provided by different educational institutions, or individual courses of study can be created based on input from a plurality of educational institutions. For example, in a virtual medical school, a pre-med component could involve provision of a chemistry course from educational institution 20, a biology course from educational institution 22, and an anatomy course from educational institution 24, or a single chemistry course could be created (or other course) via input from each of the educational institutions. The universities and students are registered by the intermediary, that is, the universities agree to provide educational subject matter to the intermediary and the intermediary agrees to provide educational services to the student according to any of the arrangements described herein.

A sponsor 36 is shown in Fig. 1 in association with intermediary 26. Sponsor 36 may provide some or all of the financial support needed to implement the system of the invention. In this way, one or more of students 28-32 can receive education at low cost, or preferably at no cost. Sponsor 36 can be an on-line service provider (in one embodiment sponsor 36 and intermediary 26 are one in the same, an on-line service provider), a pharmaceutical company, a health maintenance organization, an on-line retailer, or the like. Incentive for sponsor 36 to financially support the system of Fig. 1 is as described above; namely, sponsor 36 is given the opportunity for significant exposure of advertising or the like to the students.

Referring now to Fig. 2, one aspect of the invention as described in Fig. 1 is illustrated schematically. In Fig. 2, educational institutions 40 and 42 together establish a course of study that is provided to at least one student 44 via the Internet 46. As noted,

the course of study can include a plurality of courses, individual courses supplied by individual educational institutions, or one or more courses can jointly be created and provided by educational institutions 40 and 42.

Referring now to Fig. 3, a flow chart illustrating another aspect of the invention is shown schematically. This aspect involves using any on-line course of study to evaluate a student to determine whether the student is to be admitted to an on-campus (traditional) educational experience. At 50 an on-line course of study is established, for example via one or more universities as described above. The on-line course of study is administered to at least one student on-line (52), and during the course of study the student is evaluated at 54. The student can be evaluated by one or more, or a combination, of the educational institutions as described above, or by intermediary 26 (Fig. 1) or another entity. If performance of a student is sufficient according to the evaluation, then the student may be admitted to an on-campus course of study at 56. If student performance is not sufficient, then the student may have the choice of retrying the on-line course of study (58). If the decision is not to admit the student, then of course the student does not continue (60). If the student wishes to retry, then the student returns to administration of the on-line course of study at 52. Given the sponsorship arrangement described in Fig. 1, the student may be able to attempt the on-line course of study multiple times until sufficient performance allows admission to an on-campus course of study. This may result in the admission of highly qualified students to a traditional educational on-campus experience who may have required multiple attempts because of learning disabilities or insufficient educational opportunities during formative years (e.g., because of lack of opportunity, lack of financial resources, etc.), and who therefore requires remedial education and perhaps multiple attempts prior to success.

As mentioned above, some or all of the educational programs of the invention can be provided to students at low cost or free of charge. The invention contemplates providing an entire course of study including a first stage on-line course of study and a second stage on-campus course of study at low cost or free to students in a preferred embodiment. This is possible because it is expected that only a small percentage of students attempting the on-line course of study will complete it and advance to the on-campus course of study and it is likely that a percentage of students beginning the on-campus stage will drop out after a short period of time. Accordingly, the overall investment required to support all students through graduation (through the second stage)

is low relative to the number of students involved. As sponsors can advertise during the on-line course of study and the advertising is not necessarily solely relevant to graduates of the entire program (e.g. in the virtual medical school, not only would pharmaceuticals be advertised, but general consumer products or other products highly relevant to those who do not finish the program), properly charged advertising through the overall program can nearly or fully financially support those who graduate.

Referring now to Fig. 4, a plurality of educational institution computer systems 60, 62, and 64 form a computerized exchange 66 connected to a plurality of student computer terminals 68, 70, and 72 via a wide area network 74. The wide area network 74 can be formed from a plurality of dedicated connections between student computer terminal 68-72 and the computerized exchange 66, or may take place, in whole or in part, over a public network such as the Internet. Communication between the student terminal 68-72 may take place according to any protocol, such as TCP/IP, and may include any desired level of interaction between the student terminals and the computerized exchange 66. In Figure 4, intermediary 26 and sponsor 36 can be associated with the wide area network.

One example of a computerized exchange system, including a description of messages to be sent between a user terminal and a computerized exchange computer, is set forth in U.S. Patent No. 5,873,071, the content of which is hereby incorporated by reference. The invention is not limited, however, to the particular computerized exchange described in this patent or to the particular message protocol or communication protocol used therein. Rather, the invention applies broadly to any computerized or traditional exchange that may be configured to implement the algorithms and methods of the invention.

Referring now to Fig. 5, a computer system 100 for implementing educational systems of the invention includes at least one main unit 102 connected to a wide area network. The main unit 102 may include a processor (CPU 108) executing software necessary to carry out any of the arrangements described herein (e.g., course of study and evaluation software 109). CPU 108 is connected to a memory system including various memory devices, such as random access memory RAM 110, read only memory ROM 112 and one or more databases 114.

The computer system may be a general purpose computer system which is programmed and programmable using a computer programming language, such as C,



C++, Java, or other language, such as a scripting language or even assembly language. The computer system may also be (in full or in part) specially programmed, special purpose hardware, or an application specific integrated circuit (ASIC).

In a general purpose computer system, the processor is typically a commercially  
5 available microprocessor, such as a Pentium series processor available from Intel, or other similar commercially available device. Such a microprocessor executes a program called an operating system, such as UNIX, Linux, Windows NT, Windows 95, 98, or 2000, or any other commercially available operating system, which controls the execution of other computer programs and provides scheduling, debugging, input/output  
10 control, accounting, compilation, storage assignment, data management, memory management, communication control and related services, and many other functions. The processor and operating system define a computer platform for which application programs in high-level programming languages are written.

The database 114 may be any kind of database, including a relational database,  
15 object-oriented database, unstructured database, or other database. Example relational databases include Oracle 8I from Oracle Corporation of Redwood City, California; Informix Dynamic Server from Informix Software, Inc. of Menlo Park, California; DB2 from International Business Machines of Yorktown Heights, New York; and Access from Microsoft Corporation of Redmond, Washington. An example object-oriented  
20 database is ObjectStore from Object Design of Burlington, Massachusetts. An example unstructured database is Notes from the Lotus Corporation, of Cambridge, Massachusetts. A database also may be constructed using a flat file system, for example by using files with character-delimited fields, such as in early versions of dBASE, now known as Visual dBASE from Inprise Corp. of Scotts Valley, California, formerly  
25 Borland International Corp.

The main unit 102 may optionally include or be connected to an output device  
104 configured to provide information to a user. Exemplary output devices include cathode ray tube (CRT) displays, liquid crystal displays (LCD) and other video output devices, printers, communication devices such as modems, storage devices such as a disk  
30 or tape, and audio or video output devices. Likewise, one or more input devices 106 may be included with or connected to the main unit 102 and configured to enable a user to input information to the main unit 102. Examples of input devices include a keyboard, keypad, track ball, mouse, pen and tablet, communication device, and data input devices

such as audio and video capture devices. It should be understood that the invention is not limited to the particular input or output devices used in combination with the computer system or to those described herein.

It also should be understood that the invention is not limited to a particular  
5 computer platform, particular processor, or particular high-level programming language. Additionally, the computer system may be multiprocessor computer system or may include multiple computers connected over a computer network. It further should be understood that each module or step shown in the accompanying figures and the substeps or subparts shown in the remaining figures may correspond to separate modules of a  
10 computer program, or may be separate computer programs. Such modules may be operable on separate computers. The data produced by these components may be stored in a memory system or transmitted between computer systems.

Such a system may be implemented in software, hardware, or firmware, or any combination thereof. The various elements of the method of exchanging securities  
15 disclosed herein, either individually or in combination, may be implemented as a computer program product, such as course of study and evaluation software 109, tangibly embodied in a machine-readable storage device for execution by the computer processor 108. Various steps of the process may be performed by the computer processor 108 executing the program 109 tangibly embodied on a computer-readable  
20 medium to perform functions by operating on input and generating output. Computer programming languages suitable for implementing such a system include procedural programming languages, object-oriented programming languages, and combinations of the two.

The course of study and evaluation software 109 contains algorithms for  
25 execution by the CPU 108 that enable the CPU to perform the methods set forth herein. One such exemplary algorithm for execution by the CPU 108 is set forth in Fig. 3.

Referring now to Figs. 6-9, various aspects of the invention will be shown which can form a part of or be integrated into any of the embodiments described herein. Fig. 6 shows at least one educational institution 120 that provides a course of study to at least  
30 one student 122 at low cost or free of charge, and this is facilitated by a sponsor or commercial partner 124. Commercial partner 124 can provide compensation to educational institution 120 and advertising to student 122. The advertising can be for pharmaceuticals an example where the course of study is medical school, and/or other

advertising as described herein or that would be evident to those of ordinary skill in the art. This arrangement also can facilitate not only provision of on-line materials to student 122, but traditional written materials such as textbooks, journal articles, etc., paid for by sponsor 124 in consideration for the ability to advertise to the student via the course of study.

Fig. 7 shows schematically an arrangement in which a course of study can be provided to at least one student 130 via an Internet service provider 132 as part of the Internet service provided to the student. The student in this arrangement pays or has paid an Internet service fee to Internet service provider 132, and Internet services provided by the provider include a low cost or free educational course of study provided by one or more educational institutions 134. The educational institution provides the course of study to the Internet service provider in return for compensation (typically monetary). In Fig. 7, Internet service provider 132 comprises the intermediary 26 and sponsor 36 of Fig. 1.

Referring now to Fig. 8, one aspect of the invention is shown in which an intermediary 140 administers a test to at least one student 142 via Internet 144, obtains a result of the test from the student and passes on the result of the test to at least one educational institution 146. The educational institution can provide the test initially to the intermediary. This aspect of the invention can form part of an overall educational plan, a screening or admission test for a university, or the like.

Referring now to Fig. 9, an arrangement very similar to that shown in Fig. 3 is shown schematically. At least one educational institution or intermediary 150 administers a course of study via Internet 152 to at least one student 154. A student's performance is evaluated (156), and if deemed sufficient, the student is admitted (158) to the educational institution (150), or another educational institution associated with intermediary 150. If performance is not deemed sufficient, then the student is not admitted.

Those skilled in the art would readily appreciate that all parameters listed herein are meant to be exemplary and that actual parameters will depend upon the specific application for which the methods and apparatus of the present invention are used. It is, therefore, to be understood that the foregoing embodiments are presented by way of example only and that, within the scope of the appended claims and equivalents thereto, the invention may be practiced otherwise than as specifically described. In the claims

the words "including", "carrying", "having", and the like mean, as "comprising", including but not limited to.

What is claimed is:

1. A method of providing education comprising:  
registering a plurality of educational institutions,  
providing an on-line course of study to a plurality of students,  
5 measuring the performance of each of the students in the course of study over  
time,  
based on the measured performance, admitting at least one of the students to one  
of the plurality of educational institutions.
- 10 2. The method of claim 1 further comprising receiving funds from at least  
one third party other than the students and the educational institutions.
3. The method of claim 2, wherein the at least one third party is an Internet  
service provider.
- 15 4. The method of claim 2, wherein the at least one third party provides funds  
to at least one of the plurality of educational institutions.
5. The method of claim 2, wherein the third party advertises a commercial  
20 transaction, product or service to at least one of the plurality of students in association  
with providing the course of study to the students.
6. The method of claim 1, wherein the step of measuring performance is  
carried out by a third party other than the students and the educational institutions.
- 25 7. The method of claim 1, comprising providing the on-line course of study  
to at least some of the plurality of students free of charge to the students.
8. The method of claim 7, comprising providing on-line textbooks to at least  
30 some of the students free of charge to the students.
9. The method of claim 7, comprising providing non-on-line textbooks,  
journal articles, or other written materials to at least some of the plurality of students free

of charge to the students.

10. The method of claim 2, wherein the at least one third party is a pharmaceutical company.

5

11. The method of claim 2, wherein the at least one third party is a health maintenance organization.

12. The method of claim 2, wherein the at least one third party is an on-line retailer.

10

13. The method of claim 2, wherein the at least one third party is an on-line service provider.

14. A method as in claim 1, wherein the on-line course of study cannot be completed in less than six months.

15

15. A method as in claim 1, wherein the on-line course of study cannot be completed in less than one year.

20

16. A method as in claim 1, wherein the on-line course of study cannot be completed in less than two years.

17. A method as in claim 1, wherein the on-line course of study cannot be completed in less than three years.

25

18. A method as in claim 1, wherein the on-line course of study cannot be completed in less than four years.

19. The method of claim 1, wherein a third party other than one of the plurality of educational institutions provides the on-line course.

30

20. The method of claim 1, wherein the plurality of educational institutions are medical schools.

21. The method of claim 19, wherein the third party determines whether to  
5 admit the student to the one of the plurality of educational institutions.

22. The method of claim 1, wherein one of the plurality of educational institutions determines whether to admit the student to the one of the plurality of educational institutions.

10

23. A method comprising:  
providing an educational program comprising:  
a first stage of on-line, off-campus course work, and  
a second stage of on-campus education at an educational institution,  
15 wherein the admission of a student to the second stage is based on the performance of the student in the first stage.

20

24. The method of claim 23, wherein the first stage cannot be completed in less than six months, and the second stage cannot be completed in less than six months.

25. The method of claim 23, wherein the first stage cannot be completed in less than one year, and the second stage cannot be completed in less than one year.

26. The method of claim 23, wherein the first stage cannot be completed in  
25 less than two years, and the second stage cannot be completed in less than two years.

27. The method of claim 23, wherein the first stage cannot be completed in less than three years, and the second stage cannot be completed in less than three years

30

28. The method of claim 23, wherein the first stage cannot be completed in less than four years, and the second stage cannot be completed in less than four years.

29. The method of claim 23, wherein the second stage of on-campus education comprises medical school.

5

30. The method of claim 23, further comprising:  
receiving funds to provide the educational program.

31. The method of claim 30, wherein the funds are received from third parties  
10 other than the students and the educational institutions.

32. The method of claim 31, wherein the funds are received in exchange for advertising during the on-line course.

15 33. The method of claim 31, wherein the funds are funds for sponsoring the educational program.

34. The method of claim 23, wherein the first stage of coursework is provided to a plurality of students free of charge to the students.

20

35. The method of claim 23, wherein the second stage of education is provided to a plurality of students free of charge to the students.

36. A method comprising:  
25 providing Internet services to a plurality of Internet service customers; and  
in association with providing the Internet services, providing an on-line course of study by at least one educational institution to at least one customer.

37. A method comprising:  
30 providing an on-line course of study by at least one educational institution to at least one student, wherein the course of study is funded, in part or in whole, by at least one merchant interested in selling goods or services to the student or the educational



institution.

38. The method of claim 37, wherein the merchant funds the course of study in exchange for advertising as part of the on-line course of study.

5

39. The method of claim 37, wherein the on-line course of study is continuing education in a field of study, and the at least one student holds a degree in the field of study.

10

40. The method of claim 39, wherein the degree is an advanced degree.

41. The method of claim 40, wherein the advanced degree is a medical degree.

15

42. A method of providing education comprising:  
providing an on-line test to at least one student,  
measuring the performance of the student,  
providing information identifying the performance of the student to an  
educational institution for consideration of admission of the student.

20

43. A method of providing higher education comprising:  
providing an on-line course of study to a student,  
measuring the performance of the student in the course of study over time,  
based on the measured performance, admitting the student to one of a plurality of  
25 pre-determined educational institutions.

44. A method as in claim 43, wherein the measuring step is carried out by a party other than the educational institution.

30

45. A method comprising:  
providing an on-line course of study comprising a plurality of courses wherein at least one of the courses is provided by a first educational institution and a second one of

the courses is provided by a second educational institution.

46. A method comprising:

providing an on-line course of study comprising a plurality of courses, wherein a  
5 plurality of educational institutions participate in providing the plurality of courses.

47. A method comprising:

providing an on-line Internet subscription service to a subscriber, and  
offering an on-line course of study associated with at least one educational  
10 institution to the subscriber free of charge.

48. A computer implemented method comprising

receiving from a student information identifying the student and an on-line course  
of study comprising a plurality of courses, wherein a plurality of educational institutions  
15 participate in providing the plurality of courses, wherein the plurality of courses are  
stored in data files,

retrieving data from the data files,

sending the retrieved data to the student to enable the student to take the course of  
study.

20

49. A computer implemented method comprising:

receiving from a student information identifying the student and a course of  
study, sending data to the student to enable the student to take the course of study,

measuring the performance of the student in the course of study over time,

25 wherein the measured performance of the student is used for determining whether to  
admit the student to an educational institution.

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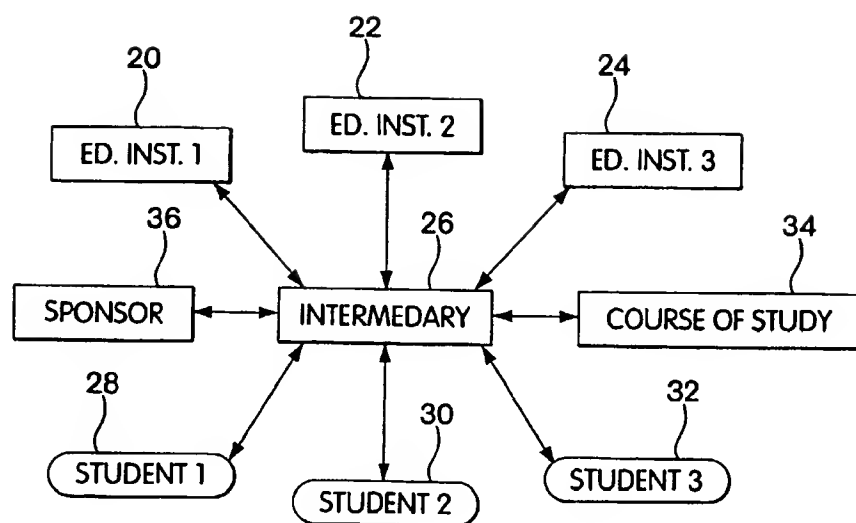


Fig. 1

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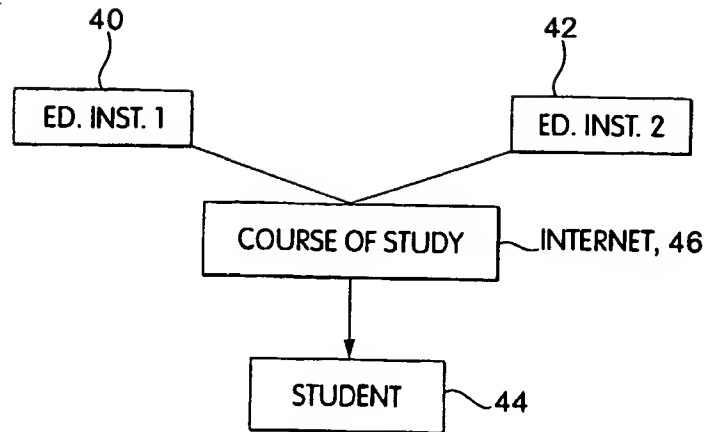


Fig. 2

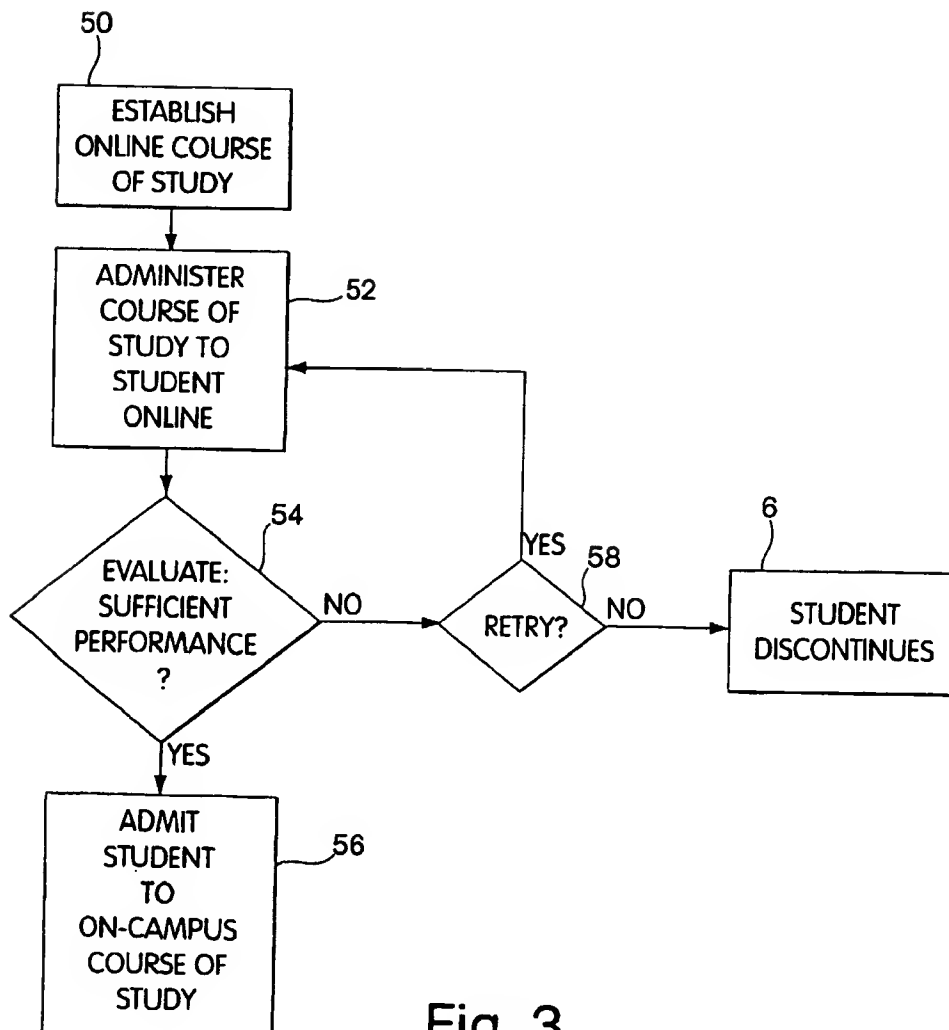


Fig. 3

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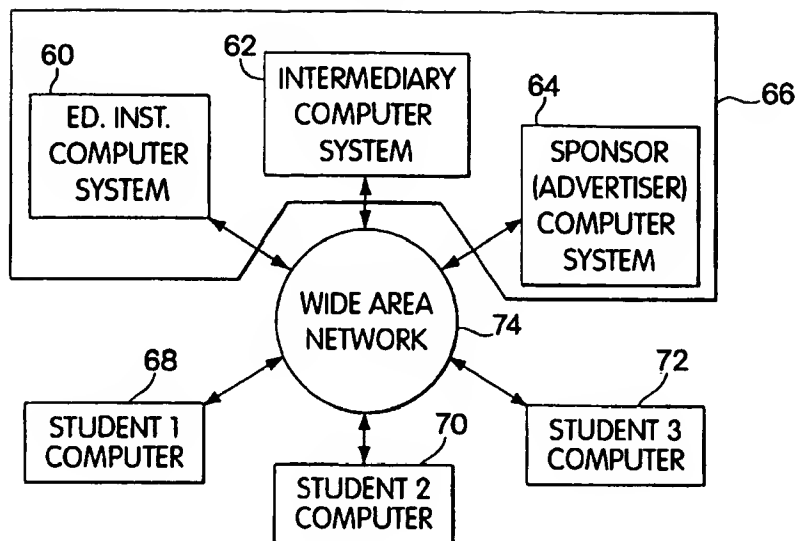


Fig. 4

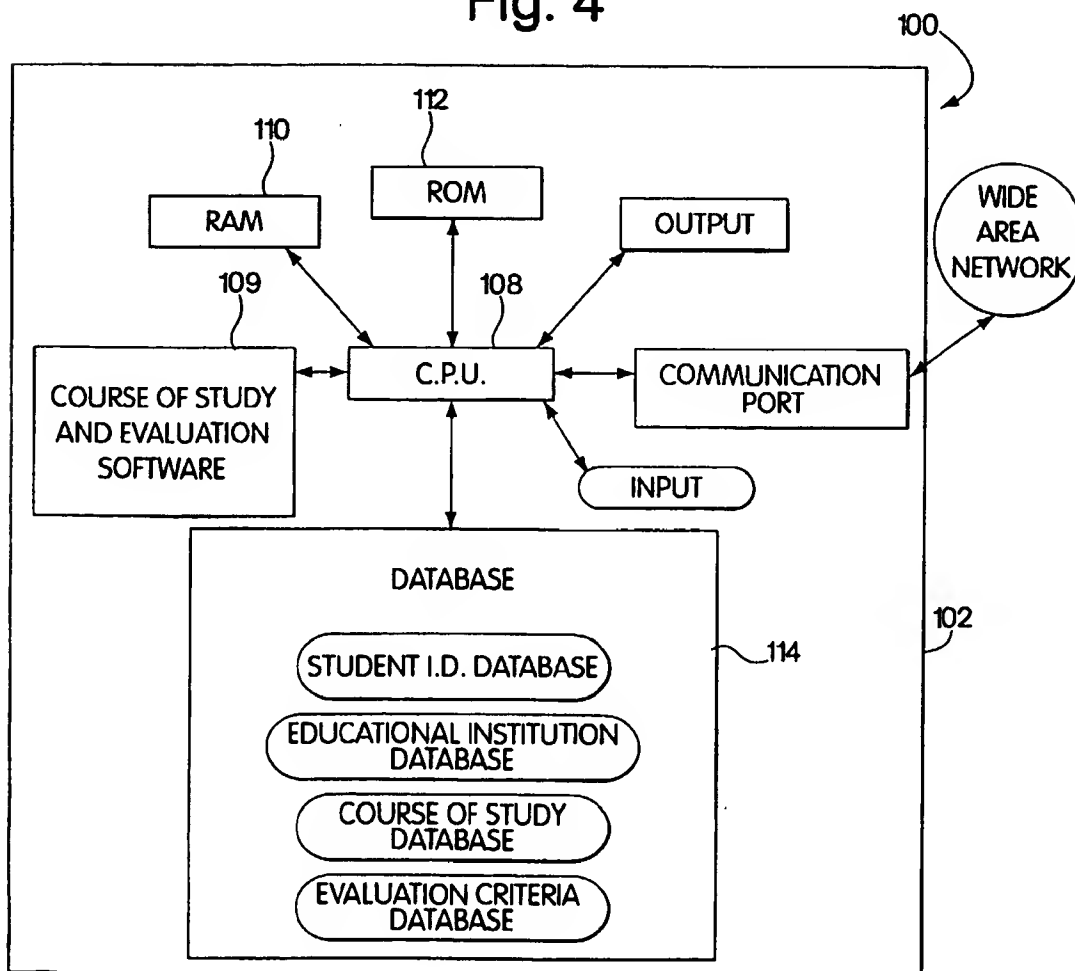


Fig. 5

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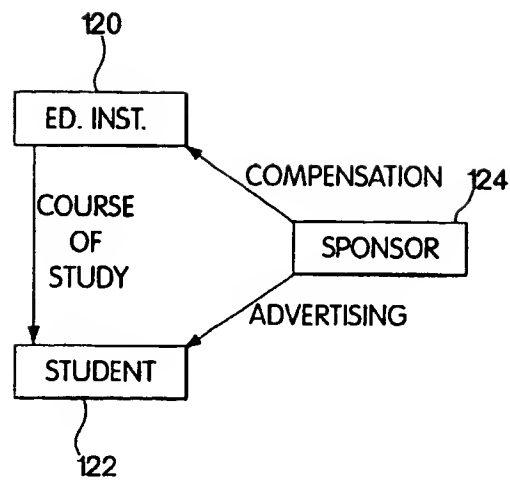


Fig. 6

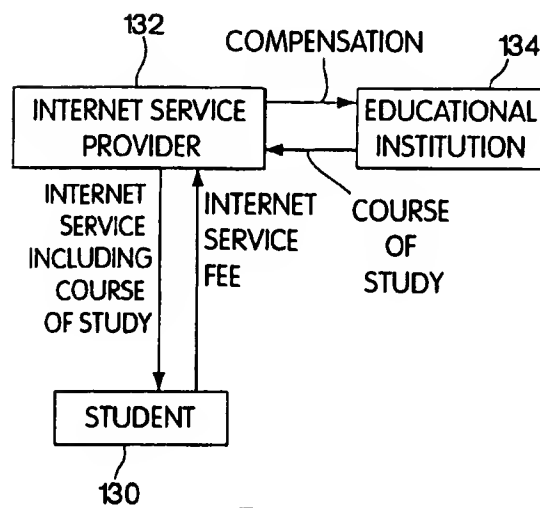


Fig. 7

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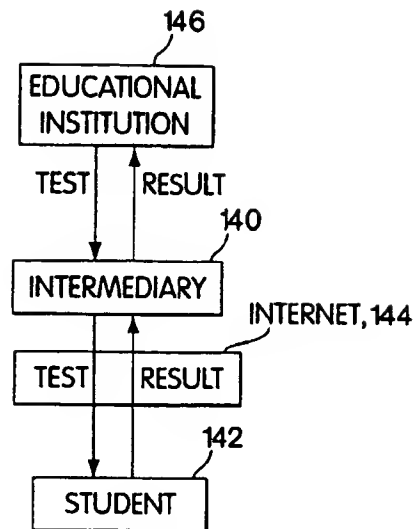


Fig. 8

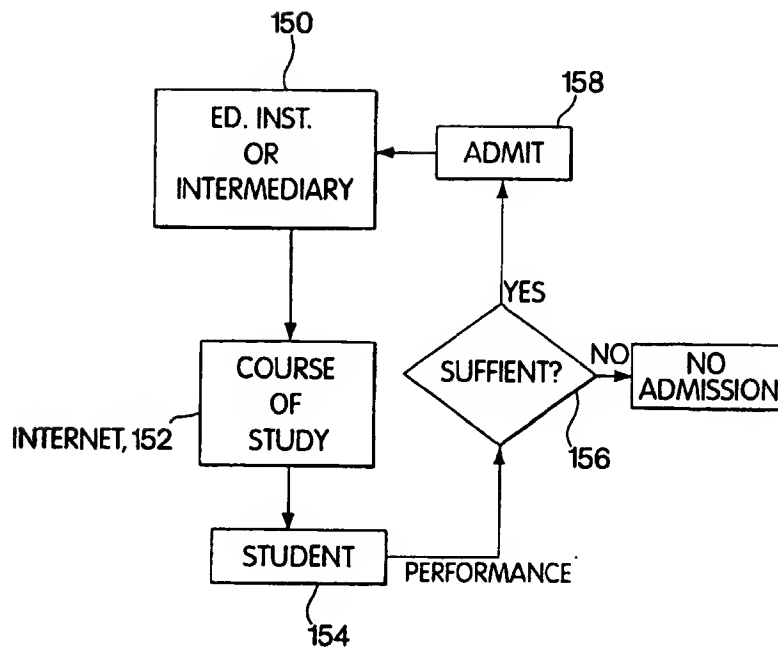


Fig. 9

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US01/40102

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : G09B 3/00, 7/00

US CL : 434/322, 323, 327, 335, 336, 350, 353, 354, 362

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 434/322, 323, 327, 335, 336, 350, 353, 354, 362

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Extra Sheet.

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,987,302 A (Driscoll et al) 16 November 1999, Whole Document.	1-49
Y	Howe, Anne. Schools Connect with One Another Via Internet. New Hampshire Business Review. 17 February 1995. Vol 17 Issue 4. p3, 2p. Whole Document.	1-49
Y,P	News Release. OU Launches Science Short Courses. The Open University. World Wide Web URL: <a href="http://www.open.ac.uk/">http://www.open.ac.uk/</a> . 2 October 2000. Whole Document.	1-49
Y,P	Depp. Michael. Students warm up to courses without the classroom. New Orleans City Business. 25 September 2000. Whole Document.	1-49

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
*A* document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
*E* earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*Z* document member of the same patent family
*O* document referring to an oral disclosure, use, exhibition or other means	
*P* document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

11 JULY 2001

Date of mailing of the international search report

02 AUG 2001

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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US01/40102

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,P	News Release. New OU flexible PGCE seen as key to addressing teacher shortages. The Open University. World Wide Web URL: <a href="http://www.open.ac.uk/">http://www.open.ac.uk/</a> . 21 December 2000. Whole Document.	1-49

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/40102

## B. FIELDS SEARCHED

Electronic data bases consulted (Name of data base and where practicable terms used):

USPTO WEST, Corporate ResourceNet, CRN Knight Ridder, Business Wire News

search terms: education, on-line, course, performance, measure, schools, institutions, colleges, universities, on-campus, off-campus